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UNITED STATES PRELIMINARY VIEW

ISSUE: Regulatory Mechanisms for Applying $EPFD_{Down}$, $EPFD_{Up}$, and $EPFD_{ISS}$[*] Limits to "N" NGSO Systems

AGENDA ITEM: ***WRC-2000 Agenda Item 1.13.1:*** *on the basis of results of the studies in accordance with Resolutions 130(WRC-97), 131(WRC-97), and 538(WRC-97):*

1.13.1: *to review and, if appropriate, revise the power limits appearing in Articles* ***S21*** *and* ***S22*** *in relation to the sharing conditions among non-GSO FSS, GSO FSS, GSO broadcasting-satellite service (BSS), space sciences and terrestrial services, to ensure the feasibility of these power limits and that these limits do not impose undue constraints on the development of these systems and services;*

BACKGROUND: The provisional power limits adopted in Resolution 130 (and included in Article S22) are intended to protect geostationary FSS systems from unacceptable interference caused by co-frequency, co-coverage non-geostationary FSS systems. Similar provisional power limits are put into place in Resolution 538 (and included in Article S22) to protect geostationary BSS systems. Once agreement is reached on the technical issue of adequate protection for geostationary FSS and BSS networks in the affected bands, it is necessary to develop regulatory text: (i) to establish and implement the relevant EPFD masks: (ii) to provide $EPFD_{Down}$, $EPFD_{Up}$, and $EPFD_{ISS}$ limits on a single-system basis to be met by non-geostationary systems that seek to use the affected bands; and (iii) to address what would happen if the aggregate interference caused to geostationary FSS and BSS networks in a particular band exceeds the maximum permissible level of aggregate interference that was

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[*] ~~$EPFD_{ISS}$~~ EPFD intersatellite limits ("$EPFD_{IS}$ limits") have been identified during the review of the Resolution 130/538 provisional limits now ongoing in the ITU-R as being necessary to address the interference case for bi-directional FSS allocations where non-geostationary FSS space stations would cause interference into receiving geostationary FSS and/or BSS space stations. The WRC-97 provisional limits covered this situation only for the frequency band 17.8-18.1 GHz, but omitted to do so for the frequency bands 10.7-11.7 GHz in Region 1, 12.5-12.75 GHz in Region 1, 12.7-12.75 GHz in Region 2, and 18.1-18.4 GHz.

contemplated when the applicable $EPFD_{Down}$, $EPFD_{Up}$, and $EPFD_{ISS}$ limits were developed.

AGREEMENTS REACHED IN ITU-R JOINT TASK GROUP 4-9-11:

In addressing the derivation of the number of non-geostationary systems to be considered in sharing studies within ITU-R Joint Task Group 4-9-11 (JTG), the JTG agreed at its January 1999 meeting that :

- An equivalent number "$N_{effective}$" of systems should be considered for the purposes of studying the impact of aggregate interference from multiple non-GSO FSS systems, under the assumption that each system operates at the single entry EPFD limits.
- There is an agreement to use a range of 3 to 5 for "$N_{effective}$" to assess interference from multiple non-GSO FSS systems into GSO FSS and GSO BSS.
- The actual number of systems "$N_{physical}$" that can operate co-frequency could be larger than the equivalent number "$N_{effective}$" of systems.
- It is likely that different non-GSO systems operating co-frequency would use heterogeneous orbital parameters, i.e., that their constellation height and inclination would not be identical and that their communication parameters would be different, such that the interference profile that they produce would not be the same.
- There is a need to define, through regulatory provisions, what constitutes a non-GSO system.
- Further studies are required from WP 4A to obtain the proper value of equivalent systems "$N_{effective}$" to be used in deriving the conversion between single entry and aggregate interference. Such studies should simultaneously consider the requirement for implementing mitigation techniques by non-GSO systems to protect the GSO (orbit avoidance) as well as mitigation techniques to protect each other, which has not been the case to date.
- There is a need for the development of a regulatory regime (WRC-00 Resolution) that would allow for more than "$N_{effective}$" systems to be deployed in a particular band (i..e, $N_{physical} > N_{effective}$), while still ensuring that the aggregate limits are met. This Resolution would take the form of a coordination procedure that would permit non-GSO systems to coordinate amongst themselves, while ensuring that the aggregate EPFD mask into GSO networks is still met.

U.S. VIEWS:

1. The United States endorses the agreements reached by ITU-R Joint Task Group 4-9-11 with respect to the derivation of the number ($N_{effective}$) of non-geostationary systems to be considered in ITU-R sharing studies.

2. The following principles represent the preliminary view of the United States on the regulatory approach to be developed pursuant to the final bullet of the foregoing agreements reached at the January 1999 JTG meeting. The objective is to ensure (i) that the agreed upon aggregate interference levels needed to protect geostationary FSS and BSS systems from non-geostationary FSS systems under the Resolutions 130/538 approach are never exceeded; and (ii) to provide a mechanism for processing publication, coordination, and notification materials from non-geostationary FSS systems, even when there are more potential systems than the number on which the $EPFD_{Down}$, $EPFD_{Up}$, and $EPFD_{ISS}$ limits were based:

   a. Each non-geostationary FSS system must meet the $EPFD_{Down}$, $EPFD_{Up}$, and $EPFD_{ISS}$ limits as verified by the Radiocommunication Bureau. Any non-geostationary FSS system that is found not to meet the applicable limits would receive an unfavorable finding from the Radiocommunication Bureau.

   b. All co-frequency operational non-geostationary FSS systems together must not exceed the maximum aggregate interference levels needed to protect GSO FSS and BSS systems.

   c. RR S9.53, which states that “the requesting and responding administrations shall make every possible mutual effort to overcome the difficulties, in a manner acceptable to the parties concerned,” specifically applies to coordinations between non-geostationary FSS systems under RR S9.12.

   d. In coordinating non-geostationary FSS systems under RR S9.12, all affected administrations should be encouraged to use actual parameters/ measurements of systems to the greatest extent possible (e.g., to correct for approximation errors, such as using traffic statistics in lieu of PFD mask).

   e. There is a need to develop a regulatory regime (most likely a WRC-2000 resolution) under which provision is made for the deployment of a number of non-geostationary FSS systems in a given band ($N_{physical}$) that exceeds the number on which the single-entry limits were based ($N_{effective}$) while still ensuring that the aggregate interference limits necessary to protect the geostationary FSS and BSS are met. This resolution should require non-geostationary FSS systems to coordinate among themselves, yet still ensure that the aggregate EPFD mask into geostationary FSS and BSS systems is still met.